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Algorithm for Nonlinear Stationary Navier-Stokes Problem

A generalized Newton's method is the basis of a new algorithm that may be used to solve the nonlinear, stationary Navier-Stokes problem of fluid dynamics. The algorithm was developed from the viewpoint that practical solutions to problems in fluid dynamics must answer the following questions: (1) Under what conditions does the sequence of functions obtained by Newton's method converge to the solution? (2) How should the initial guess be made, as a function of ν , so as to guarantee convergence? (3) At what rate does the sequence of approximate solutions converge? The algorithm has provided a family of approximate solutions for the Navier-Stokes problem.

The results of applications of the algorithm suggest that it has potential application to a variety of related fluid flow problems, such as the presently in-

tractable separation problem of aerodynamics. Details of the mathematical development, as well as the computation of explicit error estimates, are available.

Note:

Requests for further information may be directed to:

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